ASSESSMENT OF THE STATUS AND FUTURE OPPORTUNITIES OF ONTARIO'S SOLID WOOD VALUE-ADDED SECTOR

Final Summary Report
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1. BACKGROUND & INTRODUCTION

The Living Legacy Trust was established as a component of Ontario's Living Legacy Strategy to provide an opportunity to expand Ontario's capacity to improve the management of natural resources through the formation of strong partnerships among governments, environmentalists, communities and resource industries. The Trust operates at "arms length" from the Ontario Government and has a five-year "sunset date", with funding available until March of 2004 for nine major initiative areas.

One of these initiative areas — Funding Area 6 — supports the gathering of strategic information on the value-added manufacturing of wood products in Ontario.

Purpose of the project

The goal of this Funding Area, as stated in the Agreement establishing the Trust, is to initiate project(s) that increase strategic information on value-added manufacturing of wood products. Specifically, the Trust determined that this goal was to be addressed by undertaking a market and sector study to —

- benchmark Ontario's solid wood value-added sector; and,
- define the destination of Ontario's solid wood shipments.

It is these two objectives which form the focus of this engagement.

The Trust has also defined a third objective as part of this initiative — to define the opportunities for specific products or end uses for value-added manufacturing growth — which may be pursued as a further research project that could be undertaken as an outcome of this assignment.

The overall purpose of this study was to collect up-to date, relevant information about Ontario's existing value-added sector by product type and to report on the main local, national and international market destinations. As well, statistics for the entire forest products industry in Ontario were reviewed to establish basic benchmark information that would facilitate future tracking of changes between commodity and value-added production.

This document represents a standalone summary of the main research report, as well as a discussion of the analysis. The research report presents the detailed data sets and in depth analysis leading to the conclusions presented in this summary.

Project Team

Jaakko Pöyry Consulting, (JPC), was selected to undertake this study on behalf of the Living Legacy Trust through a competitive bidding process.

Jaakko Pöyry is the world's leading and largest independent consulting organisation serving the forest and forest products industry world wide. For 40 years, the company has been at the leading edge in the process of developing the forest and forest industry sectors around the world. Jaakko Pöyry Group and associate companies now have more than 5,500 employees in 25 countries.

As part of the Group, Jaakko Pöyry Consulting (JPC) focuses on management advisory services by producing facts, ideas and solutions for governments, institutions and private companies wishing to develop and increase the value creation capacity of their forest resources and/or wood processing industries. The company has more than 360 employees and achieved net sales in 1999 of Euro 39.2 million. Regional offices are Helsinki, Singapore and New York, plus country offices including: Canada, Australia, New Zealand, UK, Sweden, Germany, India, Indonesia, Brazil and Argentina.

Having carried out hundreds of studies in more than 100 countries, including 28 National Sector Plans and numerous Industry Sector Analyses on behalf of government, companies and international institutions, JPC's experience and capabilities are well suited to undertaking this important project for the Living Legacy Trust. As well, the company maintains global databases on the Forest and Forest Industry Sector including; resources, mechanical wood and pulp & paper industry, markets, cost competitiveness, economics and demographics, which formed a unique support resource to this project.

Research Objectives & Approach

The work of the study was focused on achieving three objectives —

- Establishing the framework for informed promotion of wood based value added in Ontario, with special emphasis on the solid wood based products;
- Developing an analysis of the sector built on a platform of intellectual capital – knowledge, understanding, relativity and perception of the value added opportunities in Ontario – linked to the fibre and business resources available in Ontario; and,
- Establishing an analytical and benchmarking framework, to prepare the way for a possible second phase - a detailed exploration of identified market potential and growth opportunities for Ontario's value added wood products.

In conducting this assignment, JPC brought together know-how from previous experience dealing with value added opportunities at the product and sector level. The key features of our approach included —

- Analysis of the sector as a flow of sequential stages from logs and fibre to end-use forms, flowing through a value chain characterised by interdependencies and inter-relationships, where weakness in one part of the chain affects all, and where the critical interface — for the purposes of this study — occurs at the transition from commodity to value added production.

- The incorporation of qualitative benchmarking into the analysis, including such factors as industry structure, segment clustering, technical and managerial know-how, use of technology, workforce structure, etc.

- Development of benchmark units that attempted to draw together existing product flows and value added structures as a basis for illustrating potential opportunities for value added industry development in Ontario.

- Introduction of the notion of an initial scenario vision for Ontario's value added sector, as a key milestone against which to measure progress in the future, and as foundation for focusing on appropriate value added rather value added for the sake of value added.

Data Platform — Commodity vs. Value Added

Based on the guidance provided in the Terms of Reference for the project, the consulting team developed a data platform in which the distinction between commodity and value added products was made on the premise that —

- Commodity products are traded on the open market with relatively little differentiation made by buyers between products; and,

- Value Added products were those that were not traded on the open market and were normally sold to users rather than intermediaries.

The resulting data platform and related product codes are illustrated below in Figure 1.

Readers are referred to Sections 1 & 2 in the Research Report for a detailed description of each of the products which comprise the commodity and value added groupings, as well as for a detailed description of the design, composition and tabulations of the data platform.

Figure 1: Data Platform & Product Codes

EU NACE in Black CAN SIC in Blue US NAICS in Red
X = Level of Data Available

COMMODITY				Ontario TOTAL	AB-BC-PQ TOTAL	US Great Lakes TOTAL	Nordic TOTAL	Denmark TOTAL	Germany TOTAL
dd201	Sawmilling and Planing of Wood, Impregnation			SUM	SUM	SUM	X	X	X
	2512	321113	Sawmills	X	X	X			
	2591	321114	Wood Preservation	X	X	X			
dd202	Manufacture of Veneer, Panels and Boards			SUM	SUM	SUM	SUM	SUM	SUM
	2521	321211	Hardwood Veneer and Plywood	X	X	X	X	X	X
	2522	321212	Softwood Veneer and Plywood	X	X	X	X	X	X
	321219		Reconstituted Wood Product Manufacturing	SUM	SUM	SUM	SUM	SUM	SUM
		2592	Particle Board Industry	X	X	X	X	X	X
		2593	Wafer Board Industry	X	X	X	X	X	X
VALUE-ADDED				TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL
dd203	Manufacture of Builders' Carpentry and Joinery			SUM	SUM	SUM	SUM	SUM	SUM
	2511	321112	Shingles and Shakes	X	X	X	X	X	X
	2542	33711	Wood Kitchen Cabinet and Bathroom	X	X	X	X	X	X
	Millwork Industries			SUM	SUM	SUM	SUM	SUM	SUM
	2543	321911	Wood Windows and Doors	X	X	X	X	X	X
	2549		Other Millwork Industries	X	X	SUM	SUM	SUM	SUM
		321213	Engineered Wood (excl. Truss)			X	X	X	X
		321214	Truss Manufacturing			X	X	X	X
		321918	Other Millwork (including Flooring)			X	X	X	X
		321912	Cut Stock, Resawing Lumber, Planing			X			
dd204	32192		Wood Container and Pallet Manufacturing	SUM	SUM	SUM	X	X	X
	2561		Wooden Box and Pallet Industry	X	X	X			
	2581	3399953	Coffin and Casket Industry	X	X	X			
dd2051	2599	321999	Other Wood Products	X	X	X	X	X	X
dd361	Furniture			SUM	SUM	SUM	X	X	X
	2611, 2612, 2619, 2691, 2649, 2692, 2699			X	X	X			
	337121, 337122, 337127, 337129, 337211, 337212, 337215, 33791								
2541	Prefabricated Wooden Buildings Industry			X	X	SUM	X	X	X
	321991		Mobile Home Manufacturing			X			
	321992		Prefabricated Wood Buildings			X			

Ref. Research Report, Section 2, p.14

Benchmark Regions

Two types of benchmark regions were constructed for this analysis —

- areas similar to Ontario with a diverse wood using value chain, (eg. other Canadian Provinces, US Great Lakes States, Nordic countries), and,
- areas in which the wood products industries are specifically targeted towards value added production, and from which learning opportunities can be expected to exist, (eg. Denmark, Germany.)

Other Canadian Provinces — British Columbia, Alberta, & Quebec

The other three major Canadian wood-producing provinces have been included to provide national baseline comparison. While inclusion of these jurisdictions is useful for benchmarking industry output, their inclusion is especially relevant for comparative analysis of policies and programs which have been initiated to foster development of value added wood products manufacturing, given legislative and regulatory environments.

US Great Lakes — New York, Pennsylvania, Ohio, Michigan, Indiana, Illinois, Wisconsin & Minnesota

This region incorporates a mix of primary production and extensive value added manufacturing, both of which are linked to Ontario commodity outputs. The region also exhibits a mix of forest types – boreal and St. Lawrence Basin mixed forest – which is somewhat similar to the Ontario forest base. (Though we recognize the boreal forest component is relatively more significant in Ontario.)

Most important, however, market accessibility for manufacturers in this benchmark unit is similar to that experienced by producers in Ontario. As well, the Great Lakes States constitute Ontario's closest major market, and value added manufacturers there compete with Ontario manufacturers both in Ontario and in other key US markets.

Nordic Region - Finland and Sweden

The Nordic countries demonstrate wood and fibre flows, as well as processing and end-uses that are broadly similar to Ontario — especially compared to Northern Ontario — with respect to resource base and geographical position relative to their respective major markets. These similarities enhance the value of the area as a benchmarking unit.

Denmark

With virtually no wood resources, Denmark has developed a sizeable value added wood products sector. It has been included as a benchmark region because the success of its wood products industries illustrate the importance of a number of qualitative determinants of competitiveness.

Germany

Germany exhibits a high value added focus and strongly clustered sectors in its wood products industries, especially in the wood-based panels segment. Germany is both the largest producer of and market for value added wood products in Europe. Its value added wood products industries are recognized as successful and technically sophisticated. This leadership position offers potential learning opportunities for this analysis and thus warrants its inclusion as a benchmark unit.

Structuring The Analysis

The central focus of our analysis has been to bring together the key elements of our approach — a view of the sequential value chain, the use of qualitative benchmarking dimensions, comparative benchmarking units, and development of a scenario vision of a potential future direction for Ontario — as the basis for a comprehensive perspective on the current status and future opportunities for the value added wood products industries in Ontario.

Conceptually, the elements of our approach can be consolidated in an analytical framework as presented in Figure 2, below.

Outcomes & Future Directions

The comparative benchmark data developed through the study provides the Living Legacy Trust and other key stakeholders with an understanding and initial identification of the competitive potential and opportunities for the value added wood products in Ontario. The analysis will also serve as the data platform from which future progress of the sector can be measured and from which additional planned analysis of options and opportunities to foster further development of value added wood products industries in Ontario can be undertaken, as represented conceptually in Figure 3, below.

Figure 2: Conceptual Analytical Framework

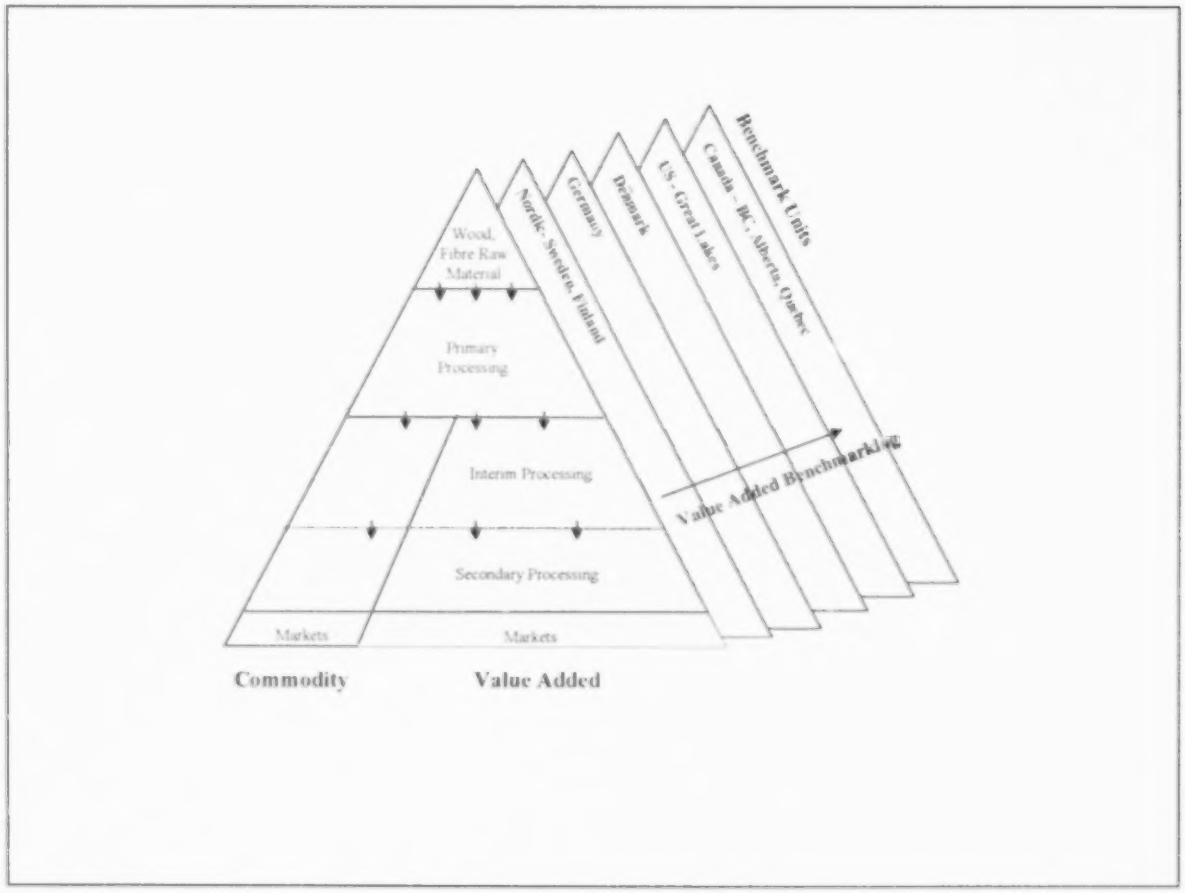
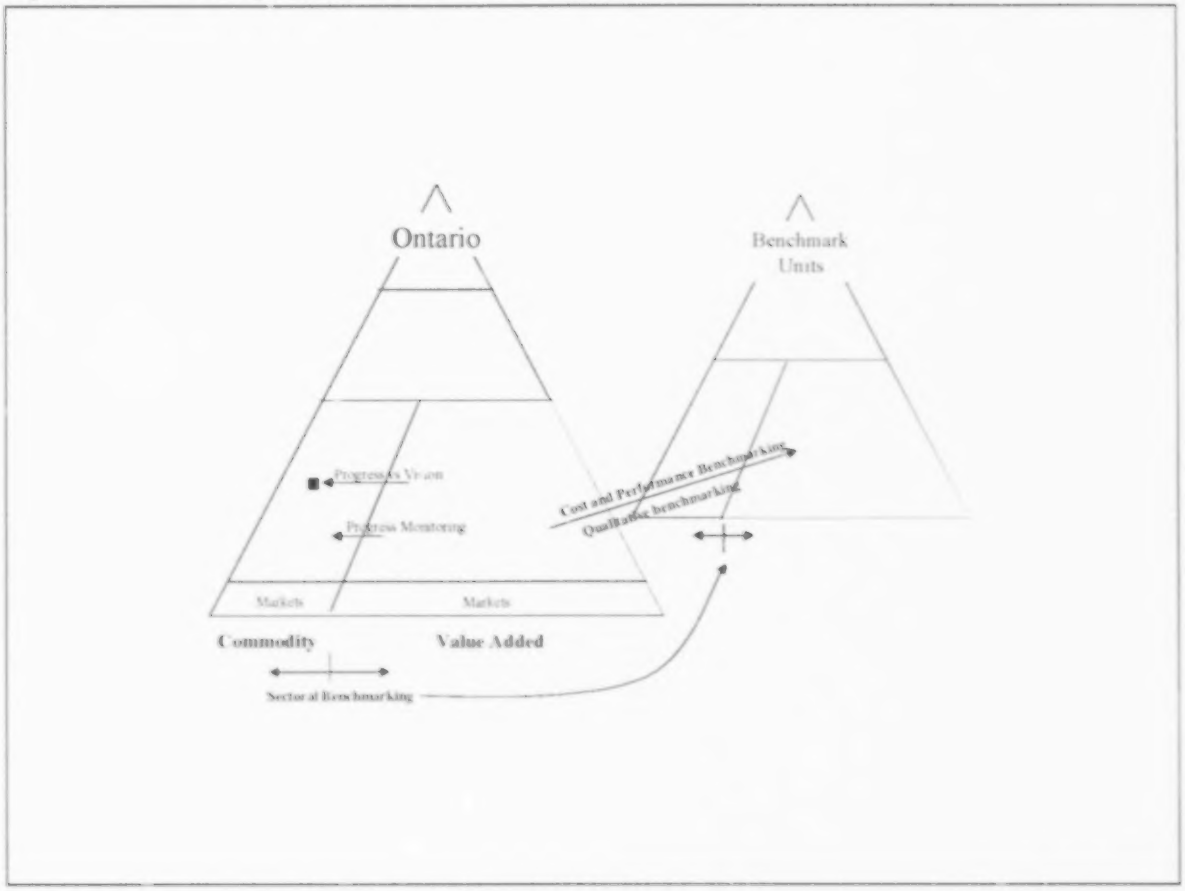


Figure 3: Conceptual Measurement Framework



2. OVERVIEW — ONTARIO'S FOREST PRODUCTS SECTOR

Total Forest Products Sector

- Ontario's forest products sector generated approximately CAD 7 billion in shipments of commodity products in 1997, (the most recent year for which complete data is available), from more than 160 establishments, which included 17 pulp, paper and paperboard mills, 11 panel mills, 11 veneer mills, 120 sawmills, and 9 other miscellaneous facilities.

- The sector generated slightly more than CAD 8 billion in shipments of value added products during the same period, from more than 1,000 establishments producing value added wood products and from approximately 300 establishment producing value added paper products.

- In total, the sector employed more than 84,000 people who earned more than CAD 3.0 Billion in wages and salaries.

Value Added Wood Products

- Ontario's commodity wood products sector generated total shipments of CAD 2.7 Billion in 1997. This compares to shipments of slightly more than CAD 4.4 Billion of commodity paper products during the same period. (See Figure 4.)

- However, with respect to manufacturing value added, the wood products and paper products sectors were virtually equal, with wood products generating CAD 4.1 Billion of value added, or 166% of commodity wood product output, compared to CAD 4.05 Billion of value added for paper products, or 91% of commodity paper product output.

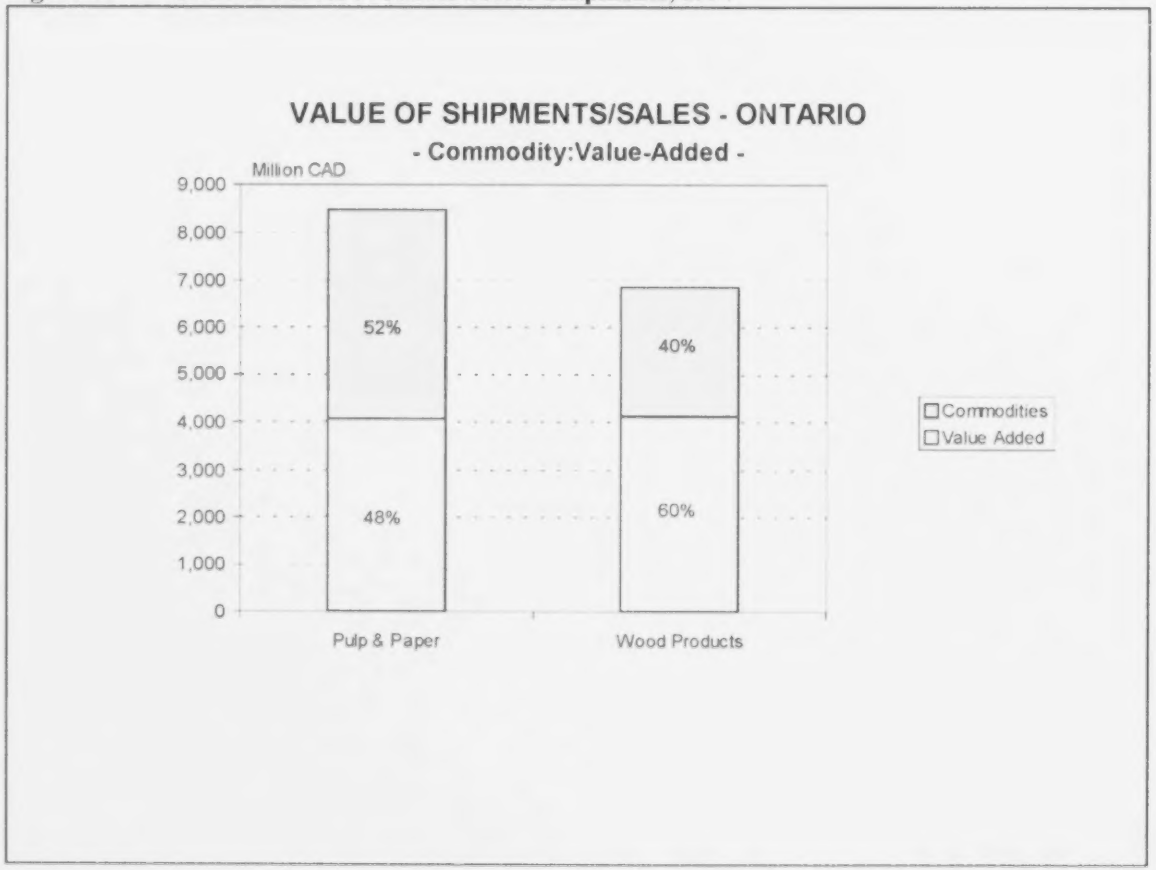
  With the expansion of wood furniture manufacturing since 1997, (which is discussed in the Research report), the project team has estimated that shipments of value added wood products likely exceeded shipments of value added paper products in Ontario in 2000.

- Employment in Ontario's value added wood products sector totalled almost 37,000 in 1997, more than 50% higher than employment in value added paper products (20,000), and almost three times the employment in primary wood products (13,600). (See Figure 5.)

- Almost three quarters, (73.5%), of Ontario's value added wood products output is exported. The US market is the dominant destination for these products, consuming 88.9% of value added wood products exports. The remaining export shipments are sold to a wide variety of international markets, with the United Kingdom, other Western European countries and Japan representing the leading markets for these sales. (See Figure 6.)

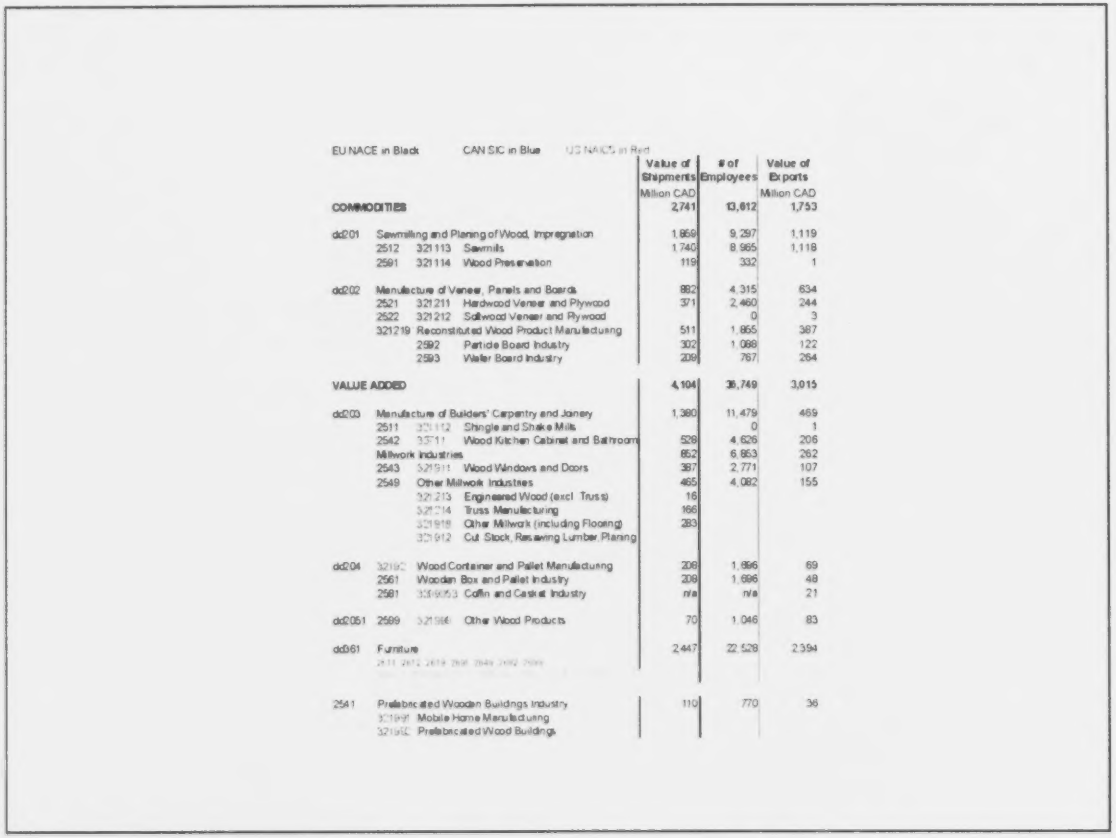
- When measured against commodity volume output, Ontario's value added wood products sector generates 181% more sales, 186% more exports, and 271% more jobs per unit of fibre manufactured than does the commodity wood products sector. (See Figure 7)

Figure 4: Ontario Forest Products Sector Shipments, 1997



Ref. Research Report, Section 3, p 19

Figure 5: Ontario Wood Products Shipments, Employment, Exports, 1997



EU NACE in Black CAN SIC in Blue US NAICS in Red

				Value of Shipments Million CAD	# of Employees	Value of Exports Million CAD
COMMODITIES				2,741	13,612	1,753
dd201	Sawmilling and Planing of Wood, Impregnation			1,859	9,297	1,119
	2512	321113	Sawmills	1,740	8,965	1,118
	2591	321114	Wood Preservation	119	332	1
dd202	Manufacture of Veneer, Panels and Boards			882	4,315	634
	2521	321211	Hardwood Veneer and Plywood	371	2,460	244
	2522	321212	Softwood Veneer and Plywood		0	3
	321219		Reconstituted Wood Product Manufacturing	511	1,855	387
		2592	Particle Board Industry	302	1,088	122
		2593	Wafer Board Industry	209	767	264
VALUE ADDED				4,104	36,749	3,015
dd203	Manufacture of Builders' Carpentry and Joinery			1,380	11,479	469
	2511	321112	Shingle and Shake Mills		0	1
	2542	33711	Wood Kitchen Cabinet and Bathroom	528	4,626	206
	Millwork Industries			852	6,853	262
	2543	321911	Wood Windows and Doors	387	2,771	107
	2549		Other Millwork Industries	465	4,082	155
		321213	Engineered Wood (excl. Truss)	16		
		321214	Truss Manufacturing	166		
		321918	Other Millwork (including Flooring)	283		
		321912	Cut Stock, Resawing Lumber, Planing			
dd204	32192		Wood Container and Pallet Manufacturing	209	1,866	69
	2561		Wooden Box and Pallet Industry	209	1,696	48
	2581	33699053	Coffin and Casket Industry	n/a	n/a	21
dd2051	2599	321999	Other Wood Products	70	1,046	83
dd361	Furniture			2,447	22,529	2,394
	2511, 2512, 2519, 2531, 2539, 2542, 2599					
2541	Prefabricated Wooden Buildings Industry			110	770	36
	321991		Mobile Home Manufacturing			
	321992		Prefabricated Wood Buildings			

Ref. Research Report, Section 3, page 20

Figure 6: Ontario Wood Products Exports, By Market, 1997

EXPORT MARKETS
EU NACE in Black CAN SIC in Blue US NAICS in Red

1000 CAD **COMMODITIES**				**Total** **1,753,115**	**Top3** **1,668,846**	**Others** **84,270**	**Country 1**		**Country 2**		**Country 3**	
dd201	Sawmilling and Planing of Wood; Impregnation			1,119,131	1,057,856	61,275		1,024,387		18,236		15,234
	2512	3211 13	Sawmills	1,118,019	1,056,788	61,231	US	1,023,426	UK	18,178	Germany	15,182
	2591	3211 14	Wood Preservation	1,112	1,067	44	US	958	Cuba	56	UK	52
dd202	Manufacture of Veneer, Panels and Boards			633,985	610,990	22,995		602,035		4,936		4,019
	2521	3212 11	Hardwood Veneer and Plywood	243,724	221,061	22,663	US	212,535	Germany	4,689	Sweden	3,837
	2522	3212 12	Softwood Veneer and Plywood	3,450	3,245	205	US	3,060	Chile	110	Japan	75
		3212 19	Reconstituted Wood Product Manufacturing	386,811	386,665	126		386,441		137		107
		2592	Particle Board Industry	122,448	122,396	52	US	122,287	Hong Kong	62	China	46
		2593	Wafer Board Industry	264,363	264,289	74	US	264,154	Israel	75	Belgium	61
VALUE ADDED				**3,014,821**	**2,950,505**	**64,316**		**2,911,925**		**28,005**		**10,575**
dd203	Manufacture of Builders' Carpentry and Joinery			467,926	449,031	18,895		434,080		9,525		5,427
	2542	3371 1	Wood Kitchen Cabinet and Bathroom Vanity	205,705	203,047	2,658	US	202,214	UK	447	Japan	386
	2543	3219 11	Wood Windows and Doors	106,847	100,918	5,930	US	97,221	Russia	2,278	UK	1,419
	2549		Other Millwork Industries	156,374	145,066	10,308	US	134,644	UK	6,800	Hong Kong	3,622
		3212 13	Engineered Wood (excl. Truss)									
		3212 14	Truss Manufacturing									
		3219 18	Other Millwork (including Flooring)									
		3219 12	Cut Stock, Resawing Lumber, Planing									
dd204	3219 2		Wood Container and Pallet Manufacturing	68,982	68,687	295		68,304		196		187
	2561		Wooden Box and Pallet Industry	47,823	47,712	111	US	47,467	UK	125	Greece	120
	2581	3399 953	Coffin and Casket Industry	21,159	20,975	184	US	20,837	UK	71	Bermuda	67
dd2051	2599	3219 94	Other Wood Products	83,420	81,129	2,291	US	72,620	Netherlands	8,146	China	363
dd361	Furniture 2611, 2612, 2619, 2691, 2649, 2692, 2699 3311 21, 3311 22, 3311 27, 3311 29, 3311 41, 3311 42, 3311 91, 3311 99			2,394,493	2,351,658	42,835	US	2,336,921	UK	10,139	Japan	4,599

Figure 7: Ontario Output Per Unit Of Manufactured Fibre, 1997

EU NACE in Black CAN SIC in Blue US NAICS in Red

CAD/m^3 COMMODITIES				Sales/m^3 159	Exports/m^3 102	Employees/m^3 79
dd201	Sawmilling and Planing of Wood, Impregnation			108	65	54
	2512	321113	Sawmills	101	65	52
	2591	321114	Wood Preservation	7	0	2
dd202	Manufacture of Veneer, Panels and Boards			51	37	25
	2521	321211	Hardwood Veneer and Plywood	371	14	14
	2522	321212	Softwood Veneer and Plywood	0	0	0
	321219		Reconstituted Wood Product Manufacturing	511	22	11
		2592	Particle Board Industry	302	7	6
		2593	Wafer Board Industry	209	15	4
VALUE ADDED				**288**	**190**	**214**
dd203	Manufacture of Builders' Carpentry and Joinery			130	42	67
	2511	321112	Shingle and Shake Mills	0	0	0
	2542	33711	Wood Kitchen Cabinet and Bathroom Vanity	31	12	27
	Millwork Industries			49	15	40
	2543	321911	Wood Windows and Doors	22	6	16
	2549		Other Millwork Industries	27	9	24
		321213	Engineered Wood (excl. Truss)	2		
		321214	Truss Manufacturing			
		321918	Other Millwork (including Flooring)			
		321912	Cut Stock,Resawing Lumber,Planing			
dd204	32192		Wood Container and Pallet Manufacturing	12	4	10
	2561		Wooden Box and Pallet Industry	12	3	10
	2581	3399953	Coffin and Casket Industry	0	1	
dd2051	2599	321999	Other Wood Products	4	5	6
dd361	Furniture			142	139	131
	2811, 2612, 2619, 2691, 2649, 2692, 2699					
	337121, 337122, 337127, 337129, 337211, 337212, 337215, 33791					
2541	Prefabricated Wooden Buildings Industry			6	2	4
	321991		Mobile Home Manufacturing			
	321992		Prefabricated Wood Buildings			

Ref. Research Report, Section 3, page 22

3. FINDINGS — COMPARATIVE PERFORMANCE MEASURES

Summary — Key Findings

- Ontario's ratio of value added sales to commodity sales is 150% and well above the similar ratio for the other Canadian Provinces included in this analysis.
- Ontario has a strong value added segment in the furniture cluster, but compared to the Great Lake States growth opportunities exist in other value added segments — in the millwork, cut stock and components segments.
- Proximity to markets is a definite asset and strong domestic markets help but are not necessarily a determinant of value added success.
- The Nordic region has demonstrated that first level reprocessing — *considered initial remanufacturing in the North American context* — does not need to take place within the geographic bounds of the consuming market. Nordic producers, (and related output statistics), treat this first level reprocessed product as a commodity, which suggests further manufacturing opportunity in the value chain not currently being exploited by Northern Ontario producers.
- Timber resources are not essential to the development of a successful value added wood sector, as is demonstrated by Denmark.

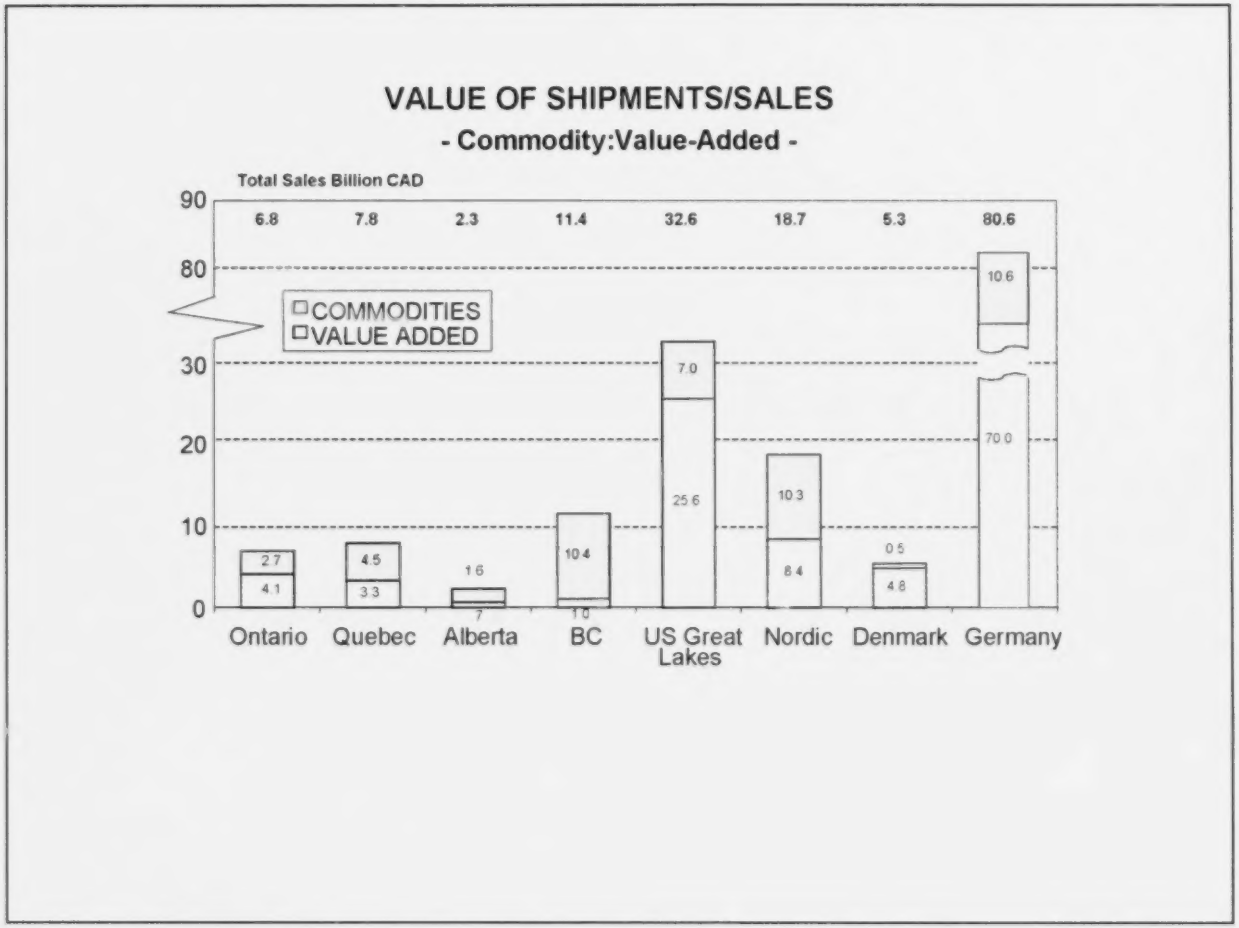
Sector Benchmarking Analysis

While the comparative output of Ontario's wood products manufacturing industries is roughly similar to Québec and the Nordic countries, Ontario leads these two jurisdictions with more than 60% of wood products shipments consisting of value added products, compared to 45% for the Nordic countries and 42% for Québec. (See Figure 8.)

Figure 8 also illustrates the tendency of value added industries to develop relatively closer to major markets, with Germany and the US Great Lakes States both exhibiting significant concentrations of value added production, 87% and 79% value added shipments respectively.

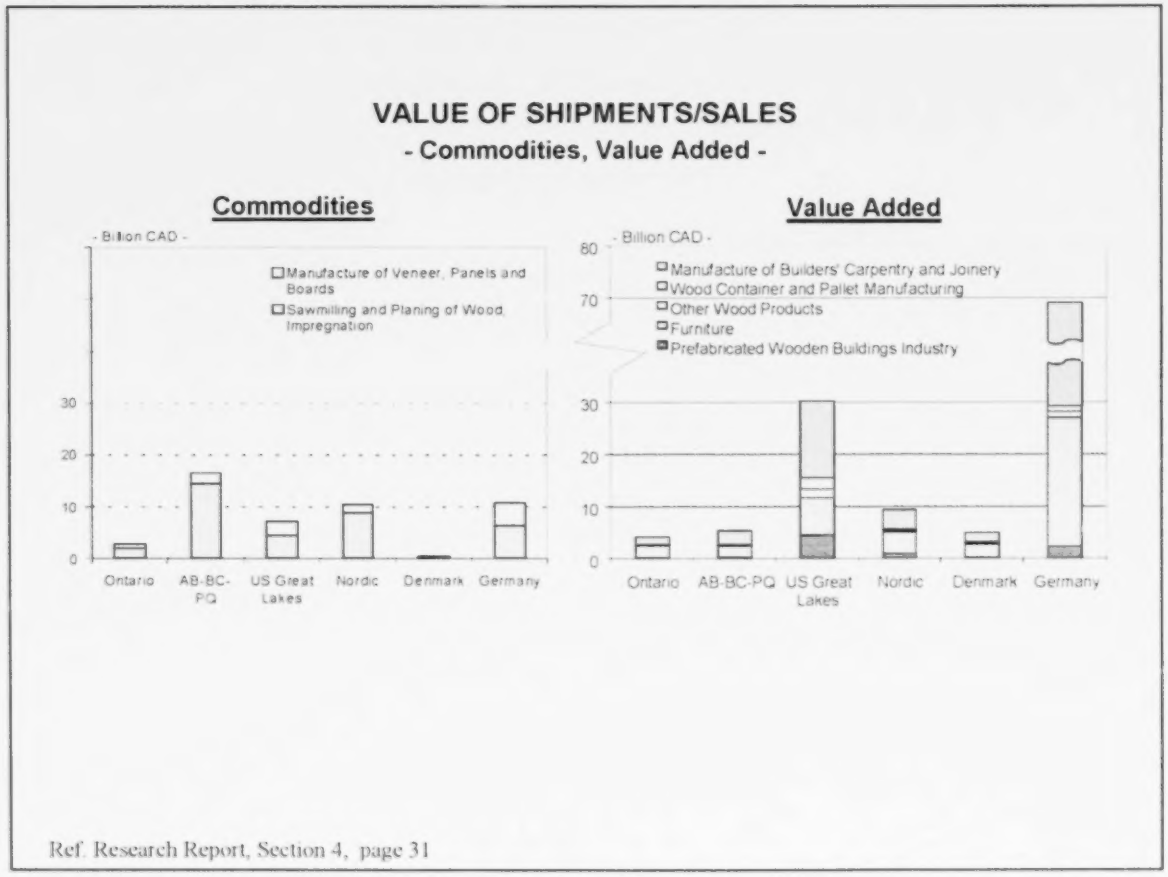
In contrast, the shipments values mix for BC and Alberta reflects the tendency for fibre resources distant from markets to attract commodity manufacturers and for the industries in these jurisdictions to produce proportionately less value added output than is found in other benchmark areas.

Figure 8: Comparative Industry Shipments



Ref. Research Report, Section 4, page 28

Figure 9: Comparative Product/Output Mix



Ref. Research Report, Section 4, page 31

Readers should note that data for the furniture industries is focused on furniture products for which the primary input material is wood; however, some other materials, by necessity, cannot be excluded or extracted from the data.

When we examine the composition of value added output, (see Figure 9, below), Ontario exhibits similar patterns to most other benchmark areas, with furniture manufacturing representing a significant portion of value added output. However, compared to most other value added segmentation, production of builder's carpentry and joinery appears to be relatively less well developed, (as a portion of total value added shipments), in Ontario than elsewhere.

It is also apparent from the data reflected in Figure 9 that proximity to large markets in regions like Germany and the Great Lakes States supports the development of wider range of manufacturing activities within the value added segment.

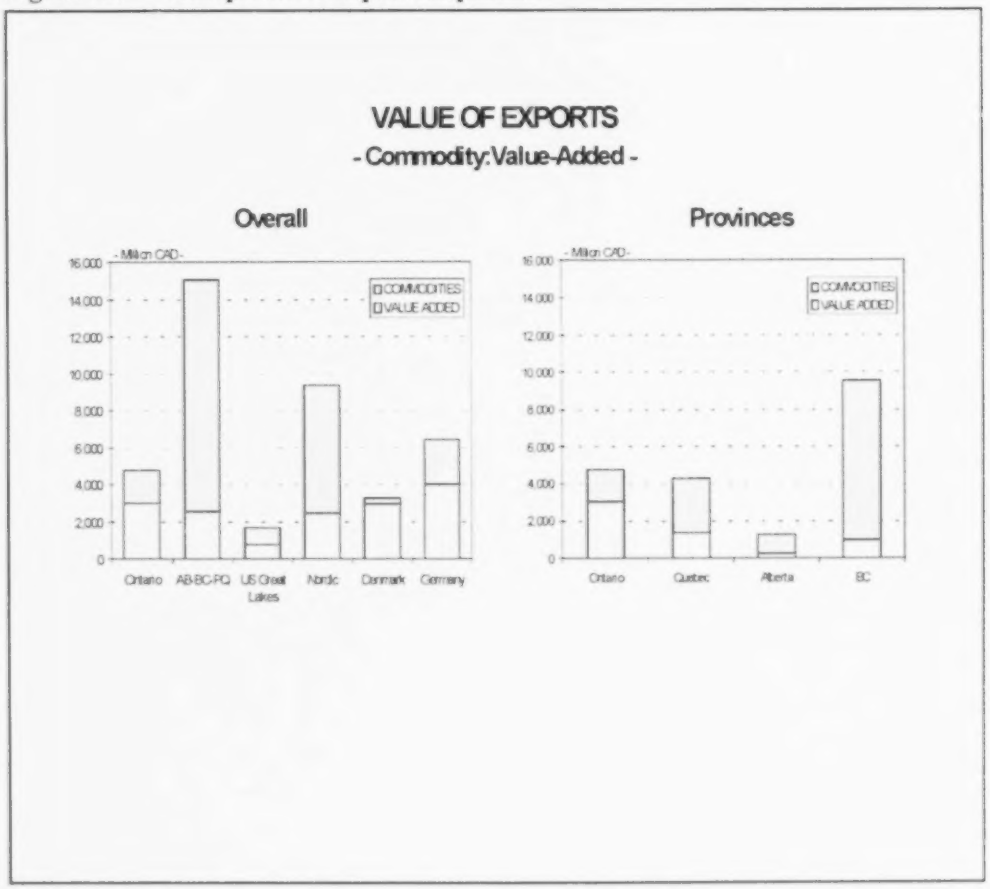
However, when we examine comparative export shipments, a somewhat different, though entirely predictable pattern is evident. That is, the benchmark areas that are more distant from major markets export relatively high percentages of both commodity and value added products, as shown in Figures 10 & 11 below.

As the graphs show, Ontario's ratio of value added exports to commodity exports is comparable to other benchmark regions and greater than for the other Provinces, which demonstrate a focus on commodity output and exports.

For Germany and the Great Lakes States, exports represent only 8% and 5% of total sales respectively, reflecting the level of demand within their large domestic markets.

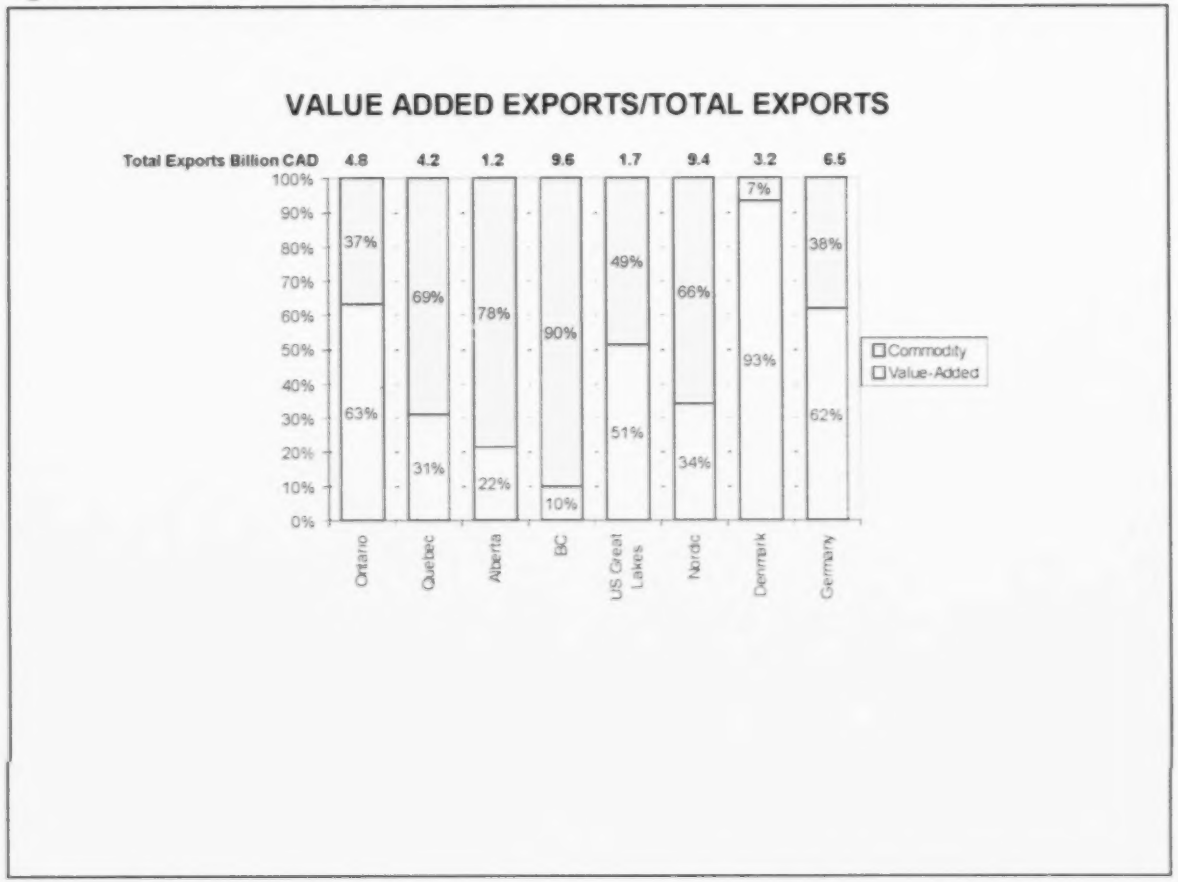
Ontario's value added wood manufacturing industries employ more than three times as many people as do the commodity product manufacturers, as shown in Figure 12 below. This ratio of value added employment to commodity employment exceeds the ratio achieved in the other Canadian Provinces and in the Nordic countries. The ratio is surpassed only by the Great Lakes States, Germany and Denmark, which have significantly more mature value added wood products industries than does Ontario.

Figure 10: Comparative Export Shipments



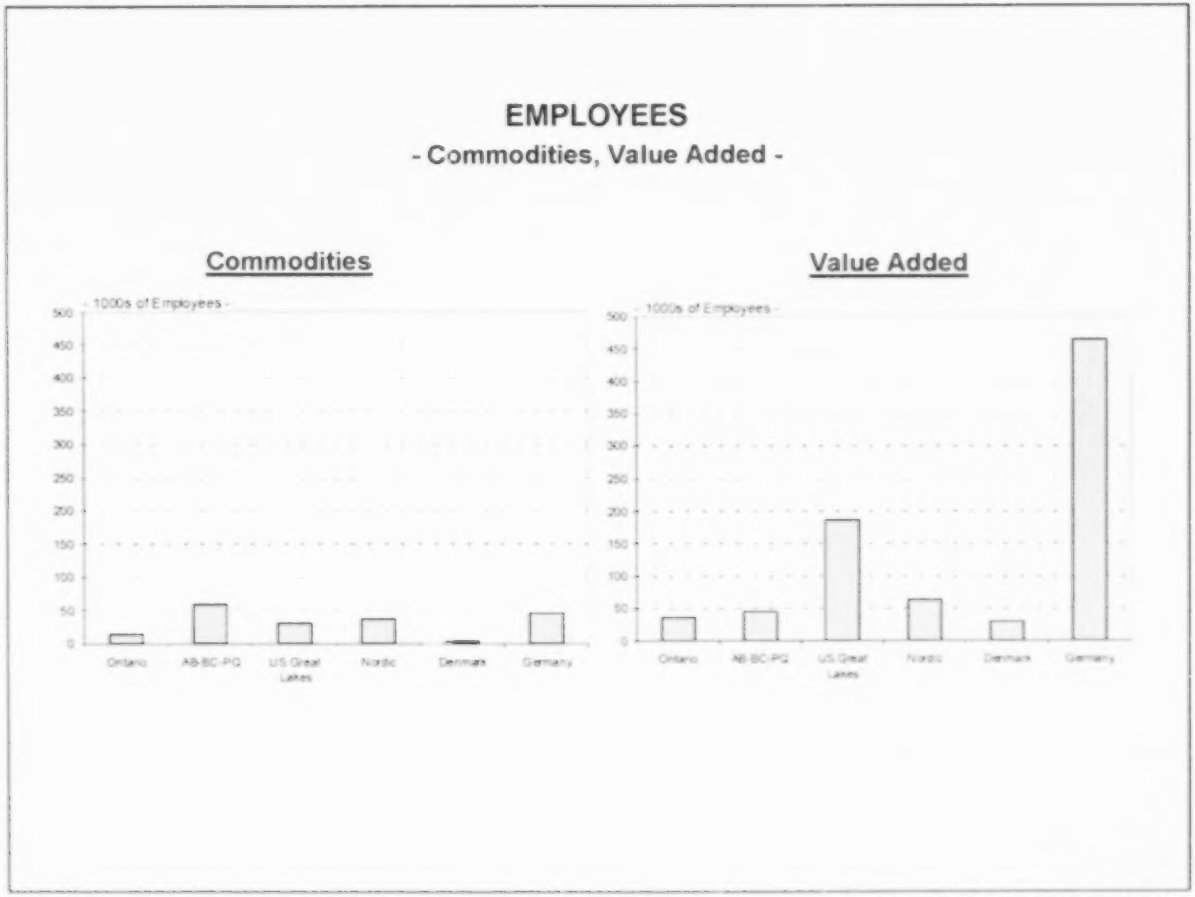
Ref. Research Report, Section 4, page 49

Figure 11: Comparative Export Performance



Ref. Research Report, Section 4, page 46

Figure 12: Comparative Employment



Ref Research Report, Section 4, page 42

4. FINDINGS — QUALITATIVE BENCHMARKING

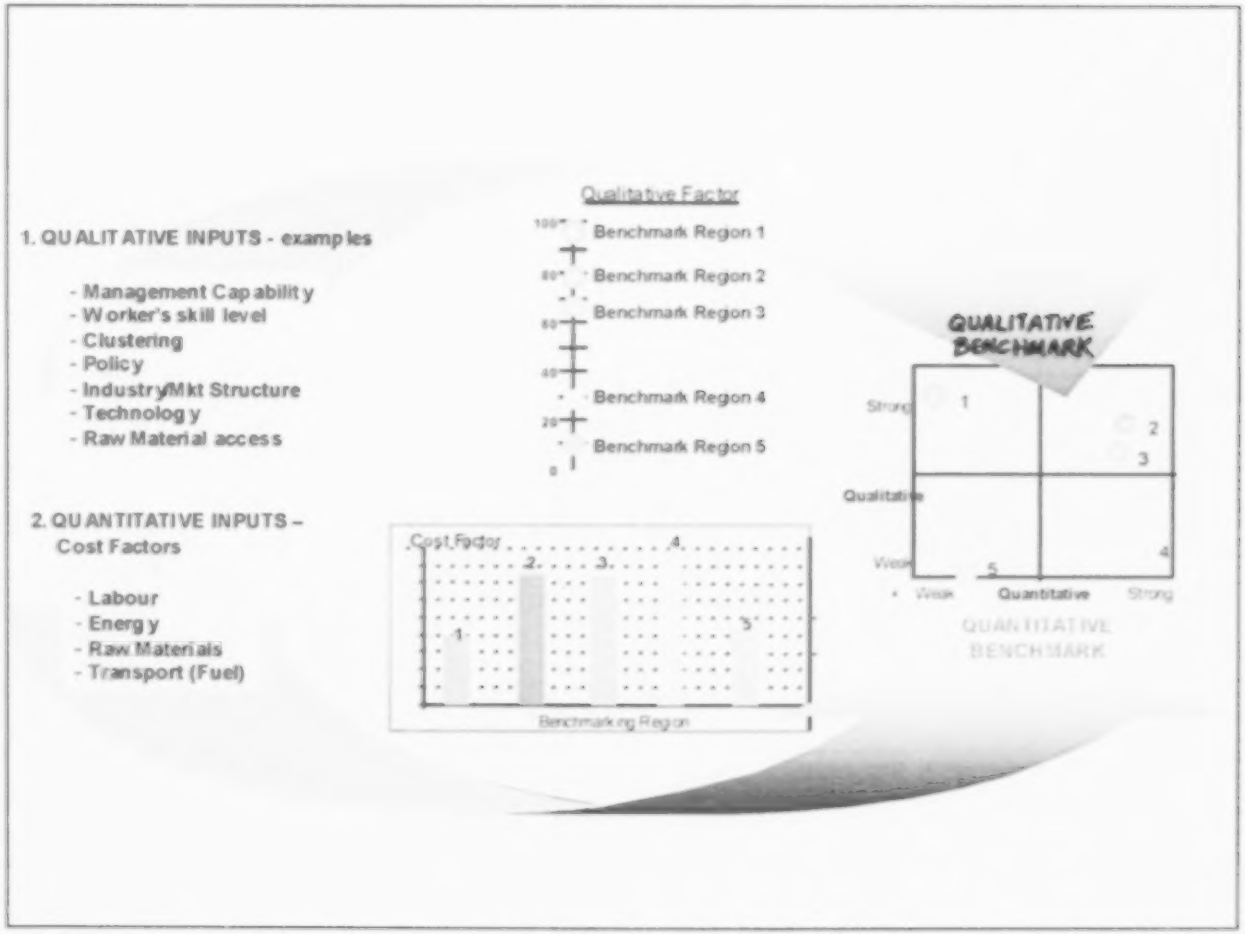
In previous sector and benchmarking studies conducted by Jaakko Pöyry Consulting, we have frequently found that the successful performers in a particular industry or segment — whether that be a national or regional jurisdiction or an individual enterprise — are not always those entities which enjoy the lowest factor input costs. In our experience, it is typically other, *qualitative* factors which ultimately determine successful performance.

These factors can include such enterprise focused characteristics as management capability and entrepreneurial orientation, work force skills and adaptability, innovation, adoption and use of new technologies. Other, more external factors can also be involved. These could include overall industry structure and relationships within the supply/value chain, access to, (and not just cost of), suitable raw materials, market accessibility and structure, and the proximity of a cluster of businesses engaged in the same industrial activity. Finally, the overall governmental policy and regulatory environment can also be an important variable for consideration.

The challenge in examining the impact of these types of factors on the performance of an industry sector is that they are *by definition* qualitative and must be evaluated using *qualitative assessment methodologies*. These include interviews with industry and sector leaders, knowledge gained from years of experience in the industry and other published research work. Ultimately, the conclusions drawn form a valuable perception and ranking of qualitative parameters, albeit based on subjective opinion from those knowledgeable about the industry. Where research findings point to a consensus view on a given indicator or factor, we believe conclusions can be drawn and framed within a benchmark, ultimately providing an effective foundation on which to develop policy initiatives.

When combined and balanced with more conventional quantitative measures, as shown in Figure 13 below and discussed in more detail in the next section of this report, the inclusion of qualitative factors contributes to a powerful analysis of sector performance and, we believe, leads to more constructive frameworks and directions for future growth and development.

Figure 13: Balancing-Synthesizing Quantitative & Qualitative Analyses — Illustrative



Qualitative Benchmark Factors

A total of seven qualitative factors were selected for analysis across the benchmark areas. These were selected based on initial interviews, to provide a mix of enterprise, sector, and environment-level impact. Readers are referred to Section 5 in the Research document for more detailed descriptions of each factor.

Management Capability —	Addresses the education, skill level and management sophistication of executives/owners in each benchmark region as evidenced both by achievement of advanced management education and ability to develop the functional competences
Skill Level —	Addresses the skills, experience, technical knowledge and expertise of the industry/segment workforce, as well as the ready availability of skilled support trades and professionals.
Clustering —	Addresses the flow of synergies between the manufacturers and their raw material and component suppliers, equipment manufacturers, customers and supporting institutions to foster the development of a value added *wood products culture*.
Policy Environment —	Refers to availability/offering of government policies and programs that enhance the framework conditions for business enterprises.
Industry & Market Structure & Accessibility —	Refers to the extent to which demand (both domestic and export) for value added wood products is enhanced or constrained by the level of consolidation or other relationships that exist within the value chain of suppliers, producers and markets.
Technology —	Refers to the availability and effective adoption/implementation of new technology by manufacturers of each product type/mix.
Raw Material —	Considers the impact on the competitiveness of manufacturers in the benchmark area of access to plentiful, appropriate and competitively priced raw material.

The consulting team reviewed research materials and reports pertinent to each benchmark area and conducted interviews with knowledgeable observers — including such respondents as industry technical specialists and consultants, equipment suppliers, industry participants, academics and government officials — to assess the significance and impact of each of the qualitative factors on the performance of the value added wood products sectors.

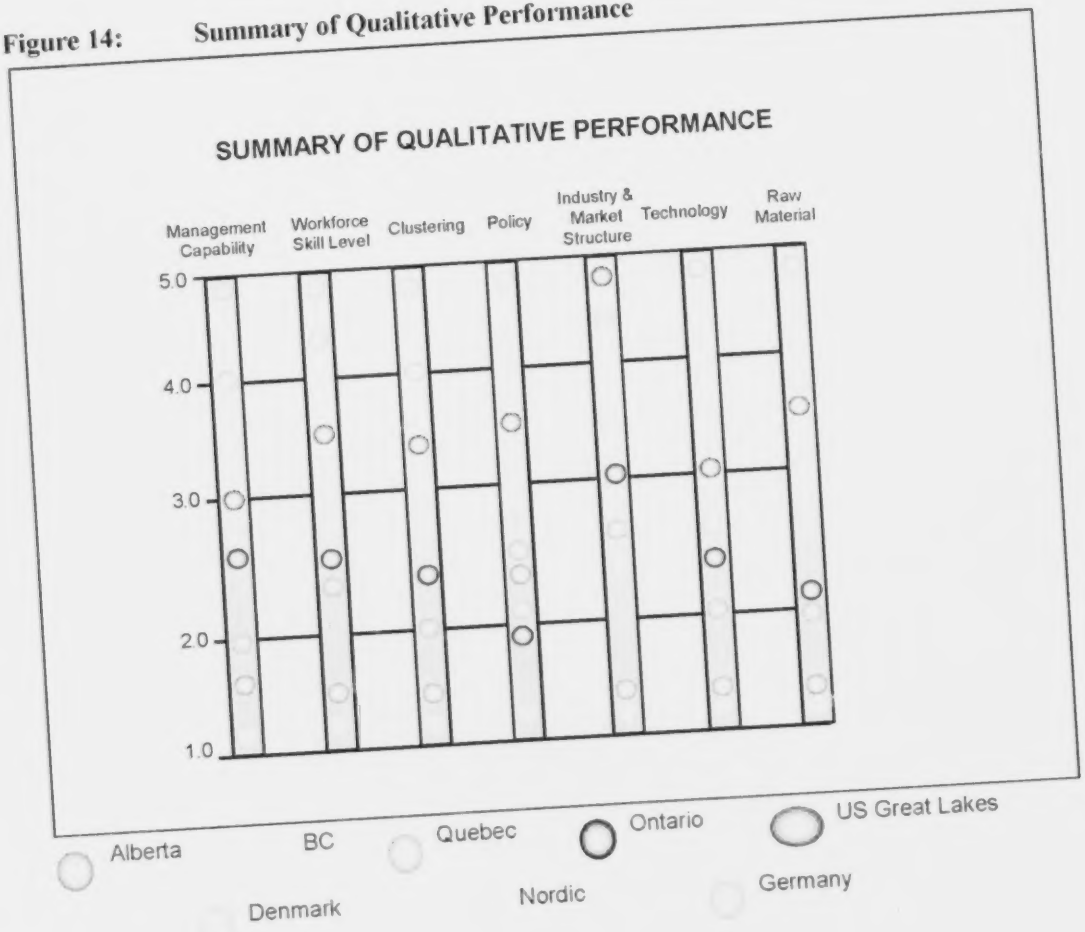
The findings from that research process were then consolidated and analysed by the consulting team to develop a *relative* ranking of each benchmark area on each of the factors. Readers should note that the rankings are intended to be *relative* only — that is, the consulting team assessed the findings on each factor to determine which benchmark area performed *relatively* the best and *relatively* the worst. These areas were then placed at the top and bottom of the five point scale respectively. The remaining areas were then placed along the spectrum of the scale in *relative* position to the best and worst performers on each factor.

The results of this analysis are presented in Figure 14 below.

Relative to the other benchmark areas, Ontario ranks in a mid range position — though higher than other Canadian provinces — on virtually all qualitative factors. The exception is policy environment, on which Ontario is ranked relatively lower than both Québec and Alberta. This relative positioning is less a statement on Ontario than it is a reflection of a more aggressive policy stance towards activist support for development of value added wood products industries in these other Provinces. Our research also showed that the Government of British Columbia has undertaken a number of policy and program initiatives to support development of value wood products manufacturing; however, the absence of any success resulting from these efforts have resulted in BC's low relative position ranking on this factor.

Overall, our research suggests Ontario's position on the range of qualitative factors reflects both the maturity of the Province's commodity industries and the increasing sophistication of its value added wood products segments. There is further leverage available to Industry and policy makers in a number of qualitative elements.

Figure 14: Summary of Qualitative Performance



5. ANALYSIS — QUALITATIVE/QUANTITATIVE POSITIONING

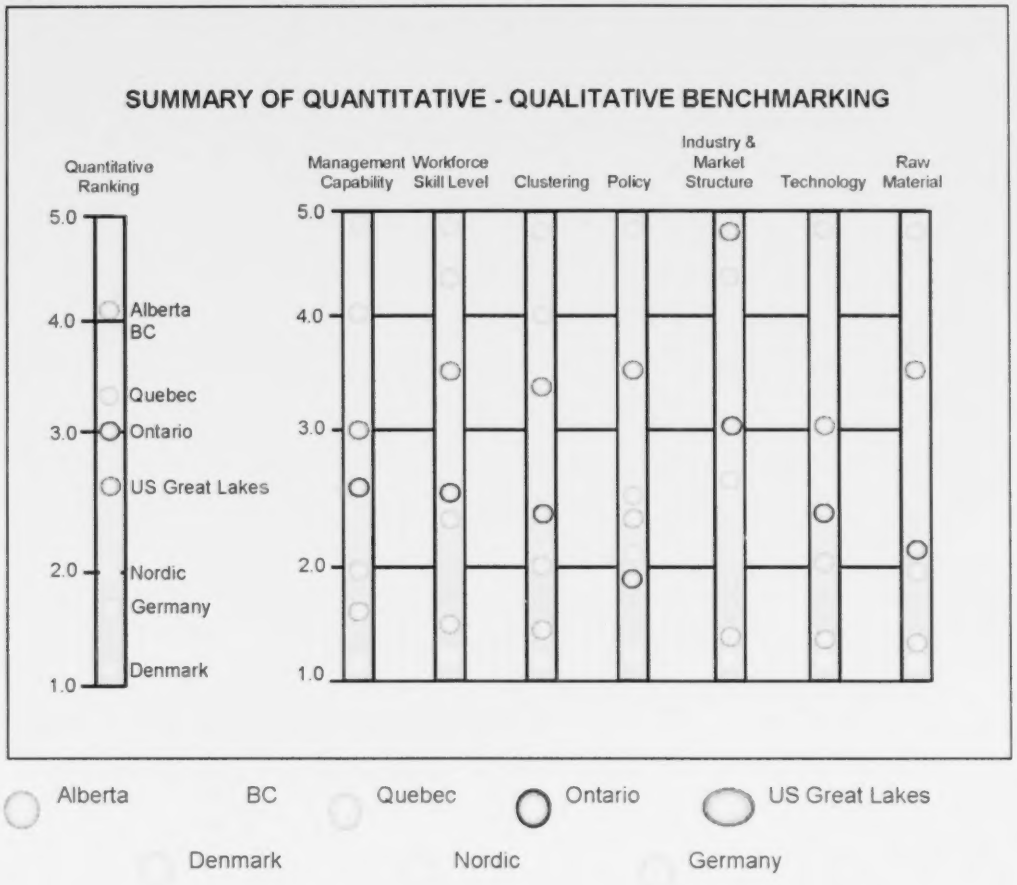
Ultimately, for a benchmarking study of this nature to generate real value added for the Living Legacy Trust and its participating stakeholders, it is essential to bring together and synthesize the findings from both the quantitative and qualitative analyses. By doing so, it becomes possible to identify areas of opportunity — particularly, for public sector programs and initiatives — that can be exploited to promote further development of Ontario's value added wood products manufacturing sector.

That is the purpose of this section of the report. The process by which the consulting team has brought together the results of the two research thrusts is set out in Figure 13, (as shown previously).

With respect to quantitative benchmarking factors, it is apparent that underlying cost structures, (eg. labour, energy, raw materials), in Alberta and British Columbia are competitive, but neither area has yet to make any effective effort to promote improved performance on qualitative dimensions as a means of development and performance of value added wood products industries. (See Figure 15, below.) On these quantitative measures, Ontario was ranked mid-way between these low cost Canadian Provinces and the high cost benchmarks of Denmark, Germany, the Nordic region and the Great Lake States. Rankings on each cost factor can be found in the research report.

Ontario ranks higher than other Canadian Provinces but lower than European and US benchmark areas on most qualitative dimensions, except policy environment, (on which it ranks below all areas but British Columbia).

Figure 15: Summary of Quantitative & Qualitative Benchmarking



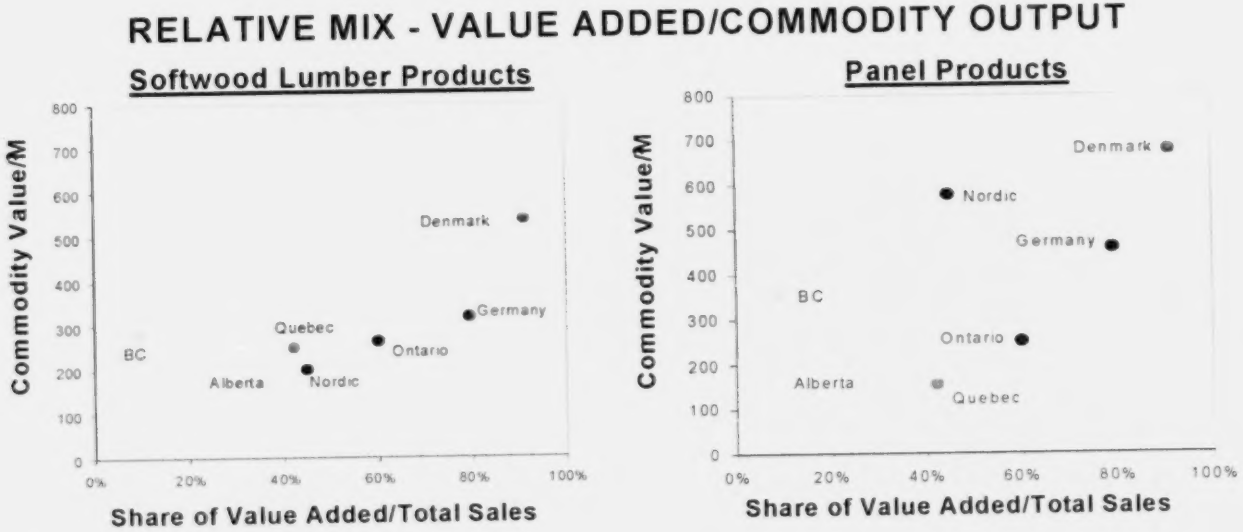
Ref. Research Report, Section 4, page 68 – Section 5, page 86

This suggests that development of a more supportive policy framework could have potential for leveraging performance improvement on other qualitative dimensions, (management capability, workforce skills and clustering), to enhance Ontario's overall competitiveness as an area in which value added wood products industries can develop and grow further.

It is also worth noting that Ontario, and especially Northern Ontario, exhibits many similarities to the Nordic region — notably species mix and forest type, dominance of commodity product manufacturing, and distance from major markets. The performance of the Nordic countries in value added wood products — particularly manufacturing of components, cut stock and lamination blanks — indicates that value added manufacturing, if carefully focused to take into account distance-driven disadvantages, can be carried out in areas distant from major markets.

The high rankings and overall performance of the value added segments in Germany and Denmark — notwithstanding the relative weaknesses of these areas on quantitative cost factors — demonstrate clearly that factors other than cost ultimately determine industrial success. The results of our qualitative benchmarking analysis support this view; but , in addition, we believe the performance of these areas on the "qualitative" factors reflects the maturity of the wood culture in those areas and the widely accepted view that value added wood products manufacturers are mainstream businesses.

Figure 16: Key Progress Measure — Value Added/Commodity Output



Readers are asked to note that the Great Lakes States have been omitted from this comparative graphic because of the absence of directly comparable unit volume production data. However, given the similarity of the region's softwood production to that produced in Ontario, we would expect unit values for that product group to be similar to values achieved by Ontario's softwood mills. With respect to panel products, again we would expect the similarity to Ontario's production mix in this product grouping would yield roughly similar unit values. We do note, however, that hardwood plywood production likely represents a slightly larger portion of total panel output in the Great Lakes States than in Ontario. As a result, we would predict that actual unit values for commodity panels in this region would be very slightly higher than values achieved in Ontario.

Another perspective on comparative performance and relative positioning can be gained from comparing unit values achieved on shipments of commodity products to value added performance of the total wood products manufacturing sector. As Figure 16 above illustrates, there is very little difference between any of the jurisdictions on unit values achieved on commodity softwood lumber products. The exceptions are Denmark and Germany, where manufacturing is focused on bespoke production and value added end-uses being sold directly into the furniture, joinery and other added value industries.

With respect to panel production, both the relatively high unit values and the relatively higher percentages of value added achieved in the European benchmark units reflect the greater degree of vertical integration and specialization — especially with respect to panel surface overlaying — which exists within the panel industries in those areas compared to North America. As well, hardwood plywood and medium density fibre board, (MDF), together constitute a higher percentage of total panel output in the European benchmark areas than is the case in North America. As both types of panels typically attract higher unit values and are well suited to further processing, we view the relative positioning of the European areas on this graphic as completely predictable.

This ratio — value added to commodity output — is recommended as a **Key Progress Measure**, providing insightful leverage in two directions —

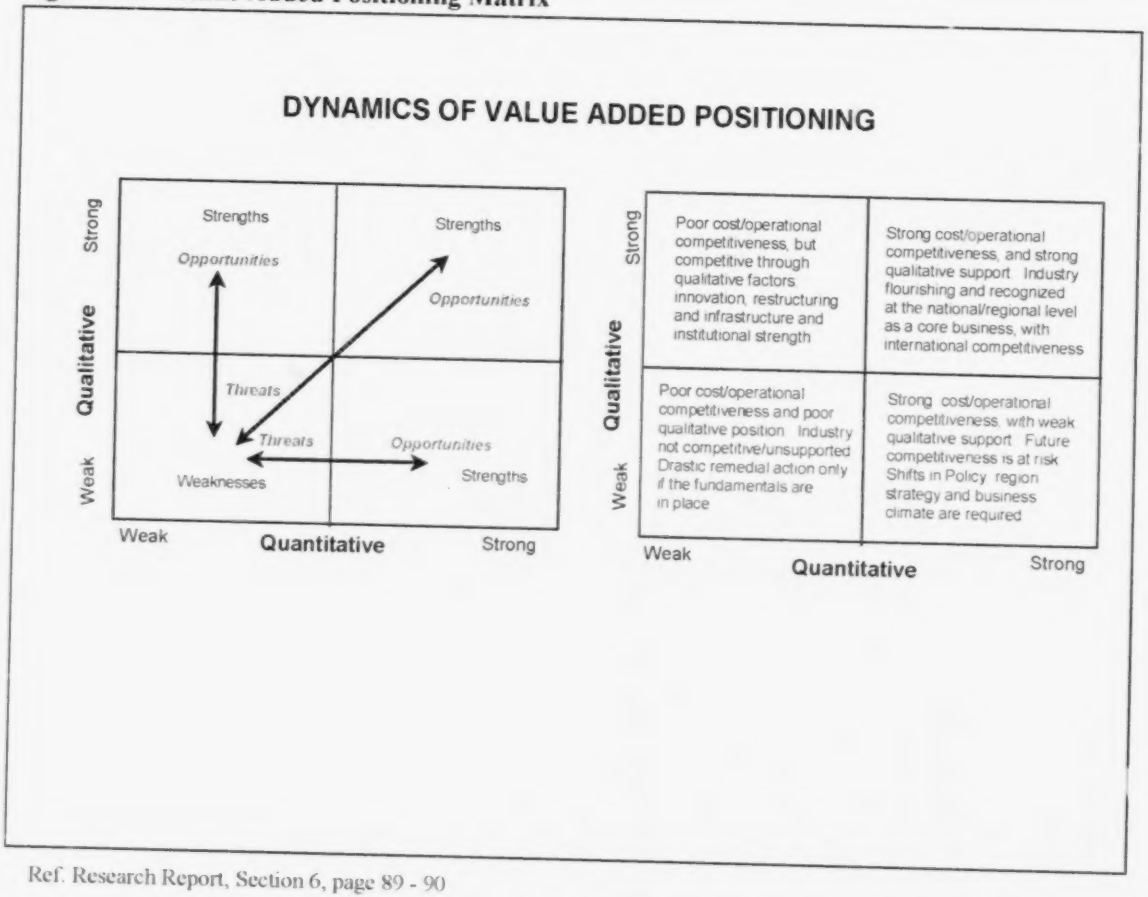
- commodity value per unit output, which measures added value created in the commodity stream; and,
- value added to total sales in the wood products sector, which indicates the degree of value achieved overall – the sector or structural performance .

Policy and industry initiatives should work in both directions for the full value to be extracted from the fibre and wood stream. In this regard, Ontario can consider establishing as targets valued added in commodity production, (both lumber and panels), by benchmark countries. Similarly, Ontario can consider developing targets and related initiatives to increase the value added to total sales ratio achieved by benchmark jurisdictions.

Positioning & Future Directions

The synthesis of quantitative and qualitative analyses facilitates positioning of each benchmark unit within a value added matrix that enables policy makers and stakeholders to identify clearly the directions for future opportunities. (See Figure 17 below.)

Figure 17: Value Added Positioning Matrix


DYNAMICS OF VALUE ADDED POSITIONING
Strengths
Opportunities
Strengths
Opportunities
Threats
Threats
Opportunities
Weaknesses
Strengths
Strong
Qualitative
Weak
Weak
Quantitative
Strong
Poor cost/operational competitiveness, but competitive through qualitative factors innovation, restructuring and infrastructure and institutional strength
Strong cost/operational competitiveness, and strong qualitative support Industry flourishing and recognized at the national/regional level as a core business, with international competitiveness
Poor cost/operational competitiveness and poor qualitative position Industry not competitive/unsupported Drastic remedial action only if the fundamentals are in place
Strong cost/operational competitiveness, with weak qualitative support Future competitiveness is at risk Shifts in Policy region strategy and business climate are required
Strong
Qualitative
Weak
Weak
Quantitative
Strong

Ref. Research Report, Section 6, page 89 - 90

In particular, mapping the relative positions of benchmark units within the matrix, enables stakeholders to identify and prioritize directional options which are most likely to result in improved sector/industrial performance — in other words, how best to move towards strength in both quantitative and qualitative factors. Figure 17 summarises the policy assessment by quadrant.

When all areas are positioned on the quantitative/qualitative matrix, (see Figure 18 below), it becomes apparent that incremental improvement in Ontario's positioning with respect to qualitative benchmarking factors is likely to yield the greatest improvement potential for the relative competitive performance of the Province's value added wood products industries.

When considered in the context of defining a scenario, the matrix positioning suggests Ontario should focus on efforts designed to move the value added wood industries towards the level of the US Great Lakes States with regard to qualitative factors.

Ontario's competitiveness on quantitative factors is mid-range on the scale for those factors. Opportunities for improvement in these areas are limited, though, to the extent practicable, the Province should guard against policy actions which could weaken its relative position ranking with respect to purchased energy and labour costs.

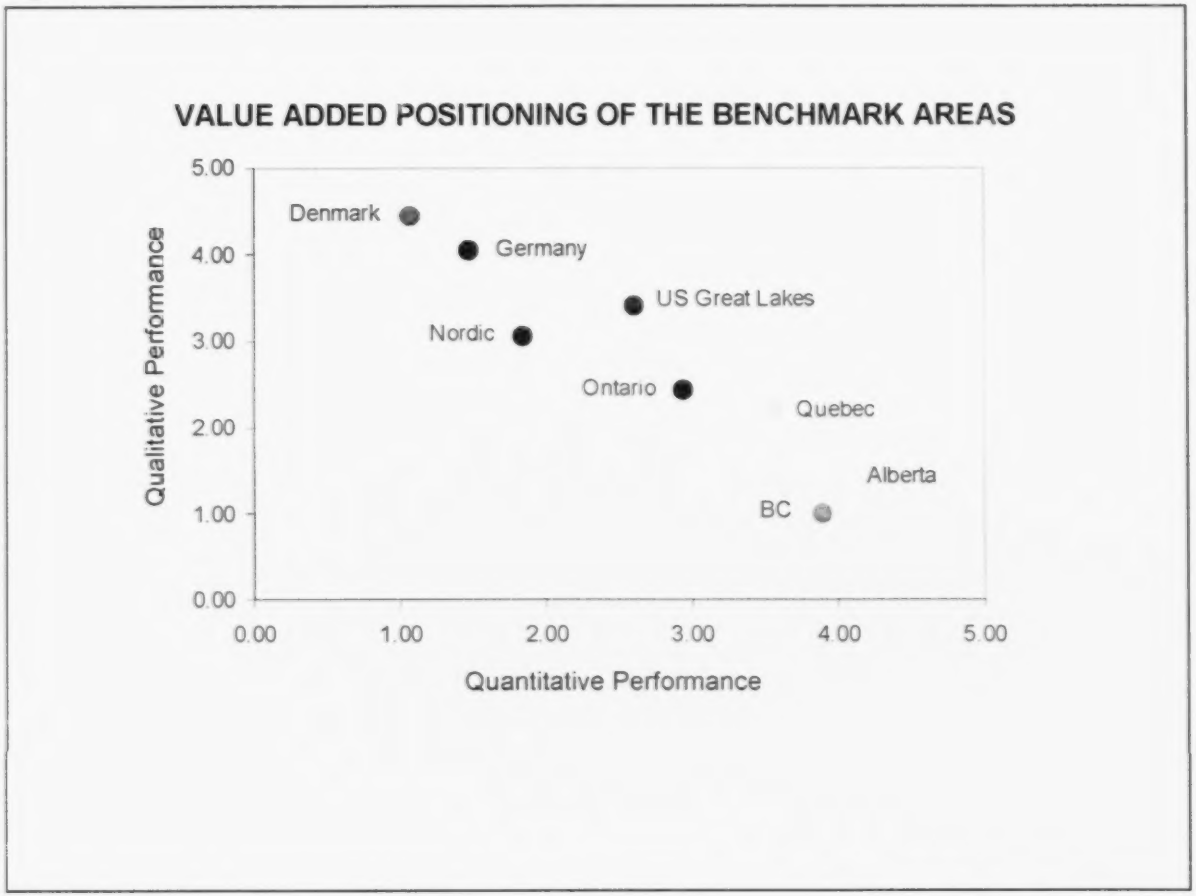
However, as noted in the analysis of qualitative factors, several of these suggest potential for improvement, particularly in relation to the US Great Lakes States.

Overall, on the range of qualitative factors considered, Ontario's relative position was weakest on policy environment. However, work force skill levels, management capability, and adoption of up-to-date technology are all indicated as areas warranting further investigation and analysis. As well, as each of these factors can be influenced through public sector policy and program initiatives, the analysis suggests more detailed investigation of options and opportunities in this area is likely to hold the greatest leverage potential for the Living Legacy Trust and key participating stakeholders.

The Value Chain & Clustering

The value chain from raw material to value added conversion differs for Ontario compared to other benchmark units. For high value added regions, notably Germany and Denmark, the interdependency between value added manufacturers (millwork, furniture) and local suppliers is strong. This is particularly so with respect to adapting and focusing products and services to meet the specific needs of manufacturer customers, well developed local component manufacturing and subcontracting, as well as a high degree of specialization, particularly in panels.

Figure 18: Benchmark Area Positioning Matrix



Ref. Research Report, Section 6, page 91

Quite purposefully, the panel industry in Germany has become concentrated into 'mega-sites' where vertical and horizontal integration make innovation, technology and know-how easily transferable. These mega-sites commonly comprise over 700,000 m3 p.a. in panel capacity. As an example, the mega-site and value integration concept is described in Figure 19. This shows for the panel sector how value integration is achieved through significantly different routes in Europe and North America. The mega-sites in Europe are built around this vertical integration with sawmills and furniture producers, and horizontal value integration with chemicals suppliers, overlaying and specialization.

To supplement this, value added benchmark regions such as Germany and Denmark have well developed importation of basic raw material, (lumber, panels), through which leverage in price and flexibility are secured. While some competitiveness derives from the cost of raw materials, there is, in addition, a willingness and indeed a requirement for raw materials suppliers to adapt products, be flexible and support product development.

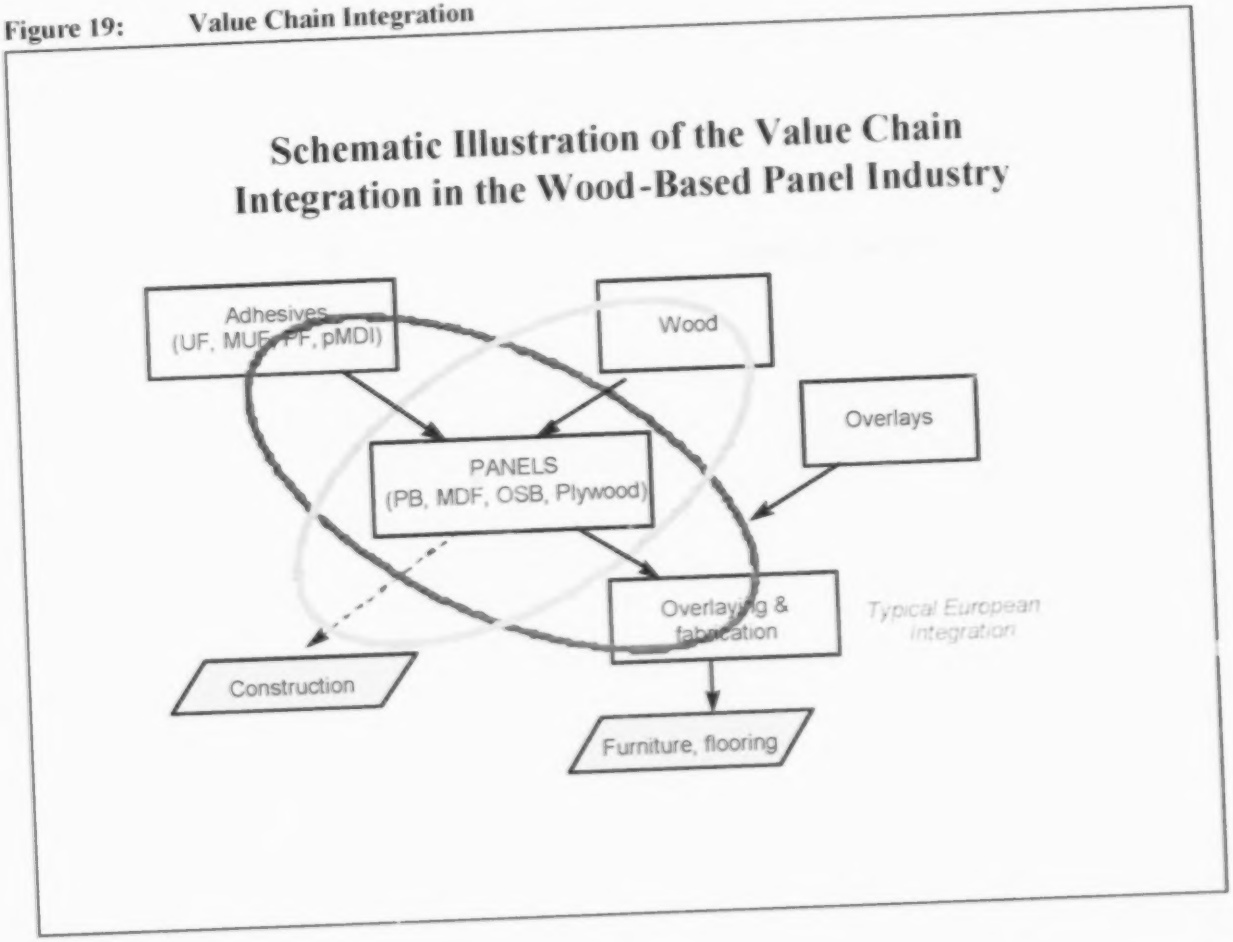
In resource-based regions, on the other hand, (Ontario, Quebec, BC/Alberta and the Nordic region), interdependency in the value chain appears at its highest between standard lumber suppliers and value added remanufacturing. This is especially so in the Nordic countries, where sawmills will often own the remanufacturing plants. Otherwise interdependency with value added manufacturers (millwork, furniture) is low. Specialization is also relatively limited. In this case, competitiveness in the value chain comes from low cost raw materials, but there is limited flexibility to adapt to the needs of value added manufacturers.

In the US Great Lakes States, there is some integration between raw material suppliers and value added manufacturers, though not to the degree such integration occurs in Denmark and Germany. To the extent it exists, such integration is evident in hardwood products, with dimension products mills frequently being integrated with primary hardwood lumber sawmills. However, in this benchmark unit product specialization is also more evident than in the resource-based benchmark units, with value added manufacturers generally focusing production to meet the precise requirements and specifications of their end use customers.

Indeed, we note the focus on manufacturing and service to meet specific customer needs is much more prevalent in those benchmarking areas with more developed value added sectors than in those areas which are more resource-based and, understandably, more commodity focused.

The qualitative benchmarking also highlighted some differences with the use of clustering to secure competitive advantage. In the context of the globalization of markets and industries, clustering, (or developing local home-based advantages), may turn out to be the only source of competitive advantage.

Figure 19: Value Chain Integration



From the interrelationships and specialization in the value chain described above, it is clear that there are differences in clustering. Even though Ontario has a relatively well developed value added sector, the segments within the sector are not well clustered or interconnected with others in the local value chain. Clearly there is additional value available within those value chains which is not being fully exploited. Of course, the other edge of that sword represents potential exposure of Ontario's value added sector to effective competition from industries elsewhere which are exploiting their local advantages, (clustering), to better effect.

Benchmark regions with strong and well developed clustering, (Denmark, Germany, Nordic and the Great Lakes States), demonstrate that leverage can be gained through effective development of clusters within the value added wood products sector to spur further growth of the sector. The example of the German panels cluster is a useful case study.

Its roots go back to 1950s and 1960s when many German sawmills invested in particleboard mills as outlets for the residue by-products. The particleboard business grew fast and many of the sawmills subsequently closed, but today, all the leading European panel producers (Sonae, Kronospan, Egger, Pfleiderer, Hornitex etc.) are represented in Germany with at least one plant. At the same time the furniture industry has also embraced the concept of modern mass produced components. This common interest binds the cluster – not common ownership of the assets, nor is the cluster institutionalized.

These together form the core of the cluster, but have attracted: the machinery sector (global leaders in reconstituted panels machinery – Siempelkamp, Dieffenbacher, Metso-Kuesters-Bison), chemicals (world market leaders producing melamine, resins, wood glues – DSM Melamine, BASF Ludwigshafen), surface materials for panels (décor paper, printing, impregnation and thermoplastic foils - approximately 20% of global production is within the cluster) and significant further processing integrated into the panel industry. The strength of the cluster is extended across Europe and world-wide though product leadership – which more than compensates quantitative disadvantages in labour and wood costs. Clustering is a key qualitative advantage.

For Ontario to exploit the leveraging potential of clustering, the success of other benchmark areas suggests that important lessons can be learned by first concentrating on extending the clustering success already evident in the furniture industries and then extending this learning to millwork and remanufacturing. It is very important to note that success with clustering elsewhere points more to industry initiating and driving the cluster, rather than to a government initiative. There are unfortunately all too many examples in the Forest Sector worldwide, where mistrust in the supply chain is hampering moves to successful clustering – to the subsequent disadvantage of all. The Government role is however, critical to providing a positive business climate in which such clusters can flourish. Keys to success in such efforts can be expected to include —

Vertical clustering through the value chain with

- Raw material suppliers (panels, lumber) to promote specialization, flexibility and product development capabilities.
- The Supply Chain (raw material to end-user) to share and promote efficiency improvements, competitiveness and innovation
- Stakeholders (see also horizontal clustering) in supporting raw materials systems such as recycling - in terms of local government, consumers, industry (panels) and NGOs

Horizontal clustering through associated industries and institutions:

- Machinery and equipment producers, supporting suppliers and industries (chemicals, energy), supporting institutions (design, standards, management skills, know-how, marketing, technology adoption), interlinked industries (textiles, metals, plastics) and stakeholders (Government agencies, unions, NGO's).

In successful clusters, innovation and education are particular focal points for NGOs and government agencies. In this role, the impact is one of risk sharing and extending the horizon of the cluster. The second key role is the networking (horizontal and vertical) of information, internal and external to the cluster – to promote the cluster and generate momentum plus critical mass.

6. CONCLUSIONS

Comparative Context

When evaluating Ontario's value added wood products industries in comparison to the other benchmark areas, it is critical to keep in mind that structural usage dominates demand for commodity softwood lumber in North America — constituting approximately 75% of total consumption. Understandably, therefore, softwood manufacturers in Ontario, and other North American jurisdictions, focus on the needs of their key market — the residential construction industry. And, the needs of this market are very well served with a supply of undifferentiated commodity softwood product.

For the value added industries, this situation results in raw material input that is first and foremost produced to meet the needs of a much less demanding end use application.

By contrast, industrial/non-structural use dominates demand for commodity softwood lumber in Europe constituting approximately 75% of total consumption. Understandably, therefore, softwood manufacturers in the European benchmark areas similarly focus on the needs of their key market — predominantly value added manufacturers.

Softwood products from primary mills in Europe are thus better suited to value added processing than North American primary softwood outputs.

As a result, the value chain, intermediate processing and industry structures in North America and Europe differ significantly from each other.

With respect to primary hardwood lumber, furniture and millwork industries dominate demand for this product in both Europe and North America. In other words, value added manufacturers are a key market for all primary hardwood mills.

Ontario's Competitive Position

Value added wood products manufacturing is already significant in Ontario. The sector is also growing — our research uncovered evidence of recent growth in specific segments, notably furniture, that indicates growth of as much 50% in the last 3 years.

With respect to quantitative benchmark factors, Ontario is reasonably well positioned relative to the adjacent, and most directly competitive benchmark areas — the US Great Lakes States and Québec.

The US, especially northeast and north central states, is a key market for Ontario value added wood products manufacturers, who are competitive in that area. Other international markets are also important, and Ontario manufacturers appear to be competitive in a wide range of export markets.

On qualitative factors, Ontario performs relatively better than other Canadian provinces, but ranks relatively lower than US and European benchmarking regions. However, current levels of competitiveness of Ontario's value added manufacturers in US and other export markets suggest that improvement of relative performance on several qualitative benchmark factors could further enhance the competitiveness of these producers and generate significant growth in the sector.

A focus on improving performance on various qualitative benchmarking dimensions is likely to generate significantly greater impact for the Living Legacy Trust and key stakeholders than will efforts focused on changing Ontario's relative position on quantitative factors.

Future Directions For Ontario

Ontario has already achieved significant success in the value added wood products industries. It will be important for Ontario to maintain the positive business climate which has attracted investment to the province, particularly and most recently in the furniture sector.

The diversity and relatively greater size of the value added sector in the US Great Lakes States appears to represent a viable directional target **(Scenario Vision)** towards which further development and growth of Ontario's valued wood products industries can be fostered. This notional target implies that further increase in the value added:commodity ratio is possible. As well, the target implies that within the value added segment, diversification of the value added potential that exists in Ontario can be achieved through further expansion of millwork and remanufacturing.

The importance of various qualitative benchmark factors as contributors to the success of the value added wood industries in other benchmark areas, and notably in the US Great Lakes States, suggests that further investigation of potential initiatives in these areas is likely to offer significant returns for the Living Legacy Trust and its key stakeholders.

For example, there appear to be opportunities for policy and program areas in which joint initiatives for government, industry and the education sector can have significant impact on the success of the industry. Key focal points could be - management capability, workforce skills and related involvement of educational institutions.

It is also worth noting that the Nordic region demonstrates that first level re-processing — e.g. cut stock, laminating and millwork blanks — need not be located close to end use markets. This suggests that evaluation of establishing such manufacturing capacity in a Northern Ontario cluster is warranted.

The dominance of and recent, rapid growth in the furniture segment suggest initial development of a furniture industry cluster is under way in Ontario. More detailed examination of the factors which have contributed to this growth may well offer lessons that can be used to further develop this and other clusters in Ontario.

The success of the value added wood products industries in other benchmark areas demonstrates that cooperation between stakeholders can create significant leverage. It is critical that the Province, the primary producers and value added manufacturers embrace the concepts of value chain (from resource to end use) and clustering if Ontario wood products are to thrive in global markets and compete effectively against well established producers from other regions.